



**Programme of activities design document form
(Version 09.0)**

Complete this form in accordance with the instructions attached at the end of this form.

BASIC INFORMATION

Title of the PoA	West African Biodigester Programme of Activities
Version number of the PoA-DD	1.7
Completion date of the PoA-DD	19/03/2021
Coordinating/managing entity	SNV Netherlands Development Organisation
Host Parties	Burkina Faso Benin
Applied methodologies and standardized baselines	AMS-I.E: Switch from non-renewable biomass for thermal applications by the user (v.11.0)
Sectoral scopes	1: Energy industries (renewable - / non-renewable sources))

PART I. Programme of activities (PoA)

SECTION A. Description of PoA

A.1. Purpose and general description of PoA

>>

The purpose of this small-scale Programme of Activities (PoA) is to stimulate the dissemination of biodigester systems in West Africa to replace traditional thermal energy generation methods at household level, to provide a high quality organic fertilizer and to contribute to avoidance of methane emissions through changing the management practice of biogenic waste. The overall objective is to come to a permanent, market based biodigester sector in Burkina Faso and Benin.

The goal of the West Africa Biodigester Programme of Activities, is to improve the quality of life of rural farmers, particularly women and girls, and their livelihoods in Burkina Faso and Benin through exploiting the market and non-market benefits of domestic biogas. The Programme will be implemented through the development of a commercially viable domestic biogas sector by establishing "National Biodigester Programme (NBP)" in each country.

Biodigesters produce biogas from human, animal or plant waste. Produced biogas can be used in cooking and heating, replacing the use of non-renewable biomass (NRB)- either firewood or charcoal. NRB when used in the production of thermal energy produces greenhouse gas (GHG) emissions, particularly carbon dioxide. By switching from NRB to biogas, which is a renewable fuel, the PoA reduces GHG emissions. Following the methodological guidance under Programme of Activities (PoA), only the replacement of non-renewable biomass (NRB) is counted as emission reduction under the CDM.

Under the PoA, the biogas will be used as a fuel for cooking. Thus, by replacing the NRB, the PoA will reduce the GHG emissions.

The programme will be implemented through a modular approach. Each module will be carried out to fit within a small-scale CDM Project Activity (CPA).

Biogas construction companies (BCCs) promoted by The Programme will be responsible for services such as marketing, construction, after sales service, and user training. BCCs can be private entrepreneurs or coop based companies. They are trained, registered as companies with regional authorities, have franchise agreements with the programme, monitored and coordinated, and report to the programme.

Key activities under the PoA are as follows:

1. Set up of the framework for the implementation: the National Biodigester Programmes
2. Launch the CPAs in a modular approach
3. Design and facilitate to maintain the data base system (electronic) to ensure there is no double counting of the biodigesters.

Voluntary Action

There are no laws or mandatory requirements in Burkina Faso and Benin stipulating the adoption of biodigester systems by households or institutions, nor their dissemination.

The proposed PoA is a voluntary action by SNV, Netherlands Development Organisation, the coordinating/managing entity (CME) of this PoA.

The households invest into the construction of the biodigester. Hence, the installation of the biodigesters is a voluntary action by the households.

Contribution to sustainable development

The installation of biodigesters has multiple health, environment and socio-economic benefits¹:

Environmental benefits:

- *Forest resources and biodiversity*: will be improved as the programme reduces pressure on remaining forest reserves in Burkina Faso and Benin.
- *Reduced GHG emissions*, contributing towards climate change mitigation efforts.
- *Air quality*²: Children and mothers will be exposed to fewer air pollutants through reduced emission of not only CO₂, but also carbon monoxide and particulate matter. Air pollution from cooking with solid fuel is a key risk factor for childhood pneumonia as well as many other respiratory diseases and cancer.
- *Fertilization with produced slurry* improves soil quality and yields and therewith increase food security in a region where scarcity is prevalent.

Social and Economic benefits:

- *Employment*: the programme will create employment opportunities within its supply chain, offices, training and monitoring activities.
- *Livelihood of the poor*: the circumstances of poor families will be improved since the biodigesters reduce fuel cost and indoor air pollution. Reduction in wood consumption implies relief from drudgery and more opportunity for productive activity, arising from less time spent collecting fuel.
- *Access to energy services*: The biogas stoves reduce the dependence on fuel wood or charcoal for cooking, which in many areas, are scarce resources or very expensive to buy. Users have also found cooking with biogas more convenient, shortening the cooking time.
- *Human and institutional capacity*: is raised through business development component of the project. The programme is based on establishing a commercially viable biodigester sector in the countries.
- *Health*: see above *air quality*. Reduction of indoor air pollution (carbon monoxide and particulate matter), reducing exposition for children and mothers and reducing children pneumonia, respiratory diseases and cancer. In addition, risks associated with open fire cooking are reduced.
- *Technological self-reliance*: the introduction of a locally manufactured technology with optimized energy efficiency helps to build technological self-reliance.
- *Production of slurry* decreases households' expenditure for fertilizers, restores degraded soils by replacing chemical fertilisers with organic compost and income of small holders increases because of better agricultural yields.

A.2. Physical/geographical boundary of PoA

>>

The geographical region within which all CPAs included in this PoA will be implemented is covering Burkina Faso and Benin. These countries are represented approximately by the following geographic coordinates:

Burkina Faso: 13 00 N, 2 00 W³

¹ As per the Clean Cookstoves Alliance, <https://www.cleancookingalliance.org/about/our-mission/index.html>

² As per the IRENA 2017: Biogas stoves are much cleaner compared to woody biomass stoves used in the baseline, see figure 3 in https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2017/Dec/IRENA_Biogas_for_domestic_cooking_2017.pdf

³ <https://www.cia.gov/library/publications/the-world-factbook/geos/uv.html>

Benin: 9 30 N, 2 15 E⁴

The project boundary

Project boundary of each CPA will be the physical, geographical site of the installed biodigesters (biodigesters and biogas cookstoves).



Figure 1: Map of West Africa showing Benin and Burkina Faso
(Source: <http://www.donparrish.com/images/WestAfricaMap.html>)

A.3. Technologies/measures

>>

The proposed PoA is a small-scale CDM project activity, applying a renewable energy technology – the biodigesters, that replace use of demonstrably non-renewable biomass in the host country:

Technology

The technology used under the PoA in its CPAs is biogas stoves which are fuelled with biogas produced from manure in fixed dome domestic biodigesters. Previously, non-renewable biomass was used for cooking and the biogenic waste was not managed.

The biodigesters provides biogas to meet the thermal energy needs of households which have at least 2 heads of cattle or five adult pigs to produce the minimum required 20kg dung per day. Proven in several other countries⁵, the technology is robust, reliable and requires little maintenance. The concrete – masonry structure can be constructed with locally available materials and skills, and typically has a life of over 20 years⁶.

⁴ <https://www.cia.gov/library/publications/the-world-factbook/geos/bn.html>

⁵ For information on SNV's activities in the domestic biogas sector worldwide, see: <http://www.snvworld.org>

⁶ "Biogas Audit Nepal 2008, Final Version"; KfW Frankfurt/Germany, and USTB Beijing/P.R. China; February 2009

These plants will be fixed dome plants constructed according to the specifications in the "*Manuel des Constructeurs de Bio digesteurs domestiques*". All the plants will follow the quality standards set by the program in the construction manual. The model was initially designed and developed in Nepal and slightly modified for the local context in West Africa. This model is considered to be reliable, well functioning, simple, durable and with low maintenance cost.

The biodigesters are based on a uniform technical design and are installed following established technical standards. This model is designed for cow manure as a feed material. So the households feed cow dung mixed with water into the digester, which through anaerobic digestion produces biogas. The biogas produced in the digester goes to the kitchen through a pipe. The biogas contains around 60% of methane and burns odourless with clear blue flame.⁷

The biodigester plant is made up of several interconnected parts. The specific role of each component is summarized below:

- **Inlet** – The main purpose of the inlet is to mix organic material and water into homogenized mixture. This mixture is fed into the digester via an inlet pipe. A manual mixer in the inlet helps mix the organic material and water thoroughly.
- **Digester** – The digester holds the mixture of manure and water while microorganism activity produces biogas in an anaerobic condition. It is cylindrical in shape and is made of brick masonry with a brick-made dome cover.
- **Dome** - The purpose of the dome is to collect the gas produced in the digester. This is plastered in several layers and painted with a special cement-paint mix in order to make it gas tight. Gas accumulates under the dome creating pressure and pushing down the level of the slurry and increasing the slurry level in the connected slurry tank. It is the difference in slurry levels between the slurry tank and the inside of the dome that provides the pressure to push the gas into the outlet pipe and into the kitchen.
- **The Main Valve** - The main gas valve releases the collected gas under the dome to the biogas stove.
- **Biogas Stove** - Gas is conveyed to the biogas stove in the kitchen in sub-terrain PVC pipes. Biogas produced burns through the biogas stove for cooking purpose.
- **Water Drain** – The water drain is put in at the lowest profile of the PVC pipe conveying gas to the kitchen. Its purpose is to release any condensed water from the pipeline. It needs to be opened periodically to release condensed water.
- **Slurry Outlet Tank** - The slurry outlet tank holds the slurry that the gas pressure from under the dome displaces. This slurry overflows into a composting tank as more manure is fed into the digester. The slurry (bio slurry) can either be used directly as a fertilizer in its liquid form or can be turned more solid after it has been composted with other organic material.

⁷ As per performed international tests, documented in "*Popular Summary of the Test Reports on Biogas Stoves and Lamps prepared by testing institutes in China, India and the Netherlands*", SNV Netherlands Development Organisation; February 2009

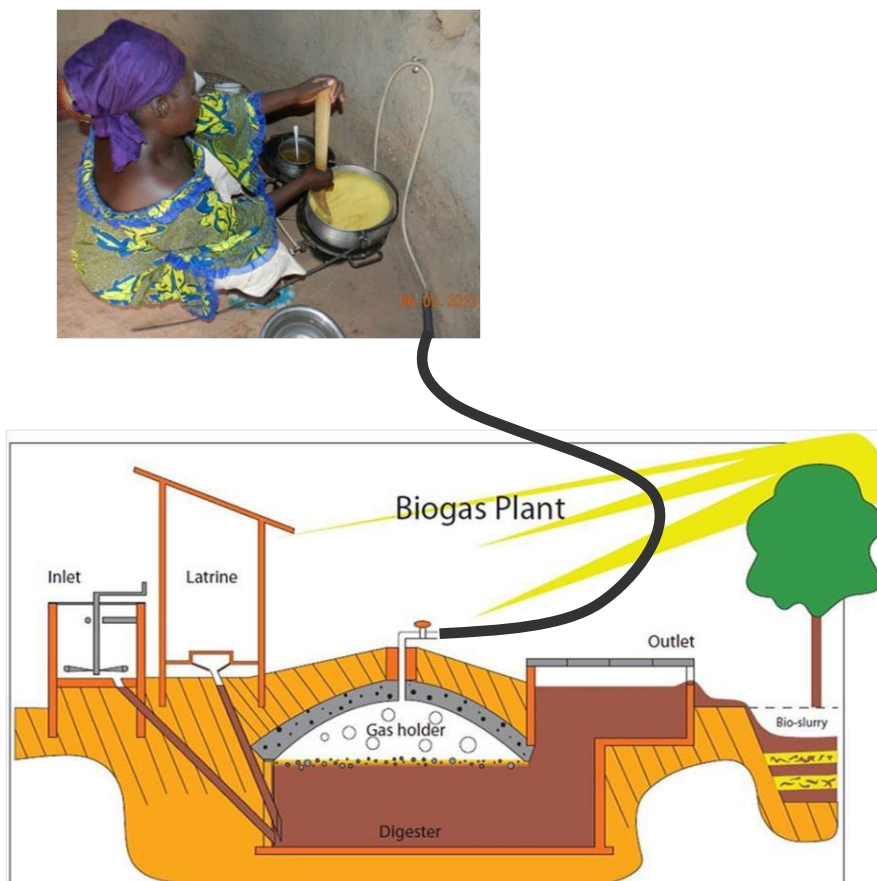


Figure 1: Biodigester implemented in this PoA – biogas stove (top) and a fixed dome biodigester (bottom)

2. Non-renewable biomass

All the biogas stoves attached to the biodigesters included in each CPA will replace the use of non-renewable biomass with biogas produced from animal manure.

As per applied methodology, the project participants demonstrate that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports, or statistics.

Demonstration of the NRB in the countries of this PoA:

- **Burkina Faso:** According to the FAO⁸, during the period between 1990 and 2010, forest cover has declined at an average of 1% per year and this has continued with 0.9% per year⁹
- **Benin:** Between 1990 and 2010, Benin lost an average of 60,000 ha or 1.04% per year. In total, between 1990 and 2010, Benin lost 20.8% of its forest cover, or around 1,200,000 ha¹⁰.

⁸ FAO 2010: *evaluation des ressources forestières mondiales 2010. Rapport national Burkina faso*, <http://www.fao.org/docrep/013/al468f/al468f.pdf> and

⁹ FAO (2018) <http://www.fao.org/3/ca0188en/ca0188en.pdf> page 23

¹⁰ <https://rainforests.mongabay.com/deforestation/2000/Benin.htm>

A.4. Coordinating/managing entity

>>

SNV Netherlands Development Organisation is the CME of the PoA. SNV is a leading organisation worldwide in establishing a market led domestic biogas sector. With its extensive experience in managing and advising the domestic biogas sector in several countries in Asia and since 2009 in Africa, SNV brings in a wealth of knowhow and lessons learnt.

SNV Netherlands Development Organisation established “National Biodigester Programmes” in Burkina Faso while the establishment of a programme in Benin is in progress - joint ventures between SNV and country ministries. NBPs will coordinate the CPAs in their respective countries, being CPA implementers.

A.5. Parties and project participants

Parties involved	Project participants	Indicate if the Party involved wishes to be considered as project participant (Yes/No)
Burkina Faso (host)	SNV Netherlands Development Organisation (public)	No
Netherlands	Stichting SNV Nederlandse Ontwikkelingsorganisatie (public)	No
Benin (host)	SNV Netherlands Development Organisation	No

A.6. Public funding of PoA

>>

CME confirms that public funding will not result in diversion of ODA.

Besides from the investment of the households, for some CPAs under the PoA there may be use of public funds.

In such case, the funding agency will issue a letter to confirm that the public funding for the CPA does not result in a diversion of Official Development Assistance, is separate from, and is not counted towards the donor country's financial obligations as party included in Annex 1 countries.

Relevant information and proof will be provided in CPA-DDs.

SECTION B. Management system

>>

SNV is the Managing/Coordinating Entity of this PoA. SNV (www.snv.org) is a leading organisation worldwide in establishing a market led domestic biogas sector.¹¹ With its extensive experience in managing and advising the domestic biogas sector in several countries in Asia and since 2009 in Africa, SNV brings in a wealth of knowhow and lessons learnt.

The CME established joint ventures with local partners to carry out “National Biogas Programmes” which are supported by local public institutions (e.g. ministries) and NGOs. These Joint Ventures will implement CPAs and hence act as CPA implementers.

Organisational Set-up of the PoA:

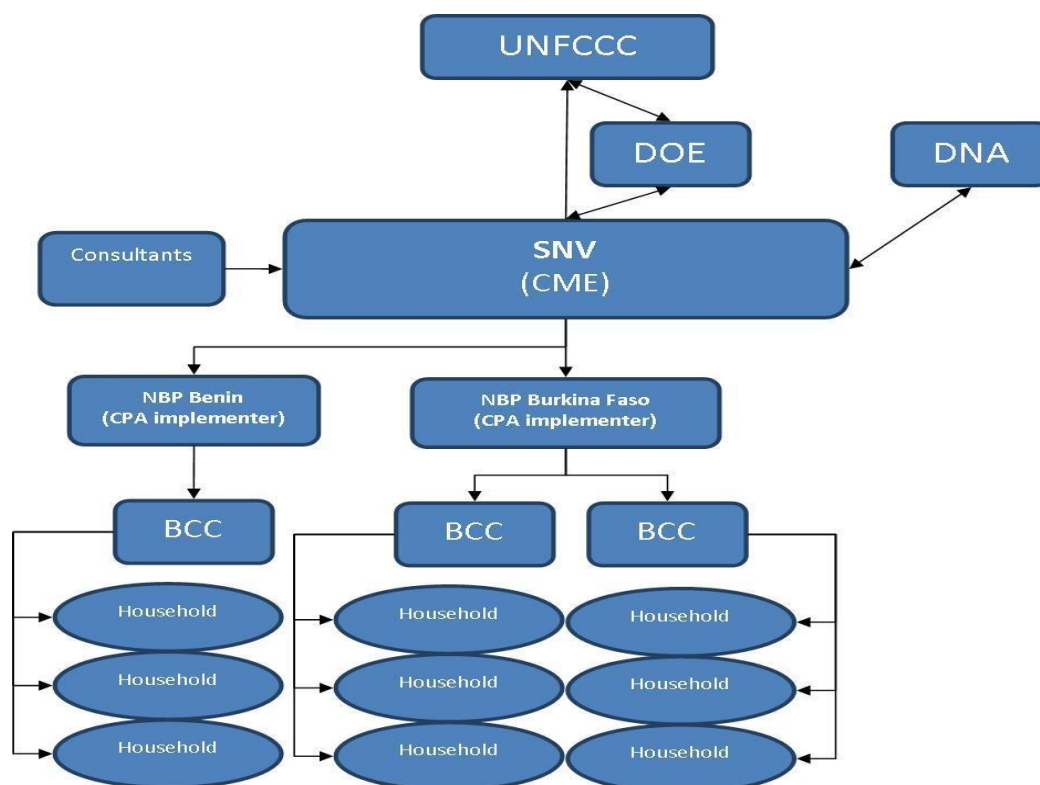


Figure 2: Organisational set-up of the PoA

The CME is responsible for:

- contracting 3rd party organisations to perform baseline studies and monitoring tasks;
- hiring DOE to conduct validation and subsequent assessments for inclusion of CPAs as well as verifications;
- communicating with the CDM Executive Board;
- signing the ERPA(s) with CER buyers and for distributing CER revenues to CPA implementers.

Each authorised CPA implementer under this PoA will sign a standard contractual agreement with the CME to participate in the PoA as a CPA implementer, in which the CPA implementer will commit itself to the following requirements:

- Those operating the CPA are aware of and have agreed that their activity is being subscribed to the PoA.

¹¹ <http://www.snvworld.org> for information on SNV's activities in the domestic biogas sector worldwide.

- The CPA implementer shall not assign a new CPA that has been already registered either as a CDM project activity or as a CPA of another PoA.
- Passing the rights to the CERs generated onto the CME
- Monitor, keep the records and report to the CME

The CPA implementers will contract Biodigester Constructing Companies (BCCs) to construct the biodigesters and report their records to CPA implementer.

Operational/management arrangements established by CME for implementation of the proposed PoA include:

a) A clear definition of roles and responsibilities of personnel involved in the process of inclusion of CPAs, including a review of their competencies;

The CME of this PoA is a single organisation. Management of the CME will be responsible for implementation of the PoA. The CDM team within the CME shall be established and tasks assigned to individual personnel as described below, and/or hire new (internal employees or external consultants) if needed.

Position	Responsibilities & competencies
CME	<ul style="list-style-type: none"> • Secures Training for the CDM team inside the CME and with CPA implementers • Secures the legal and economical issues (contracts, invoices, etc.) • Secures external CDM consultant (optional) • Keeps files on trainings • Communicates with DOE and UNFCCC Secretariat • Identifies and evaluates the feasibility and suitability of new CPAs • Ensures that the eligibility criteria are met by all assigned CPAs • Keeps a database of CPAs (PoA database) • Communicates with CPA implementers • Provides training for CPA implementers • Collects monitoring data from CPAs • Prepares monitoring reports for verifications • Any post-registration changes of the PoA-DD Quality control

b) Records of arrangements for training and capacity development for personnel;

CME staff involved in the PoA will be provided with internal training The CME will provide training to the staff of the CPA implementers who are responsible for the operation of the CPAs to ensure their ability to comply with all aspects of the PoA's requirements

c) A procedure for technical review of inclusion of CPAs;

The CME is responsible for assessing each CPA prior to inclusion. This includes:

- CPA implementer that has signed a contractual agreement with the Coordinating Managing Entity
- CPA meets the eligibility criteria of the PoA,
- Reviewing/finalization of PDDs and the evidence documentation. Then CME submits the CPA to the DOE for inclusion approval.

d) A procedure to avoid double counting

The CME will ensure that each CPA being proposed for inclusion in the PoA does not result in double counting of emission reductions. This would be done through the following:

- Ensuring that household consumers agree to concede their right to claim CERs for the equipment at the time of their purchase to the CME / CPA implementing body by signing on the purchase contract.
- Checking equipment deployed under the CPA and household where they are installed against the record keeping system being maintained for PoA. Each biodigester will carry the unique identification code. Code generation will be described in the CPA-DD. Before recording the biodigester into the CPA database, the identification code will be cross-referenced to guarantee that no double counting has occurred, and quality control will be done by the CME when entering the data to the PoA database
- Checking CPA details against the projects already under validation / registered under CDM independently or part of another PoA
- Undertaking from the CPA implementer confirming that project activity is not an individual CDM project or part of any other PoA

e) Records and documentation control for each CPA under the PoA

The CPA implementers will maintain records on end user contact information, construction data and other inventory information in a manner that enables the CME and DOE to verify that construction is indeed occurring and biodigesters are being used by households within the border of the host countries that results in a decrease in greenhouse gas emissions.

Data on the biodigesters are recorded in the field by BCCs and by CPA implementer's personnel and reported to the CPA implementer. CPA implementer keeps the records and enters the data to the CPA database. Database is established with assistance from the CME to ensure that data is collected correctly and organized in a useable fashion. Mandatory data to be collected include:

- Name of customer
- Address/location
- Phone number (if available)
- Unique identification code of the biodigester
- Biodigester model and size (defining the installed capacity)
- Date of commissioning

The CPA implementers will report the data to CME as per conditions set in the contractual agreements. The CME will enter the data to the PoA database.

In addition, the CME will order field monitoring surveys from external experts, as needed.

The CME will store the PoA database, the CPA implementers' reports, and the results of surveys in a secure server for monitoring purposes and will keep the records until 2 years after the end of the crediting period or the last issuance of CER for the PoA, whichever occurs later.

f) Measures for continuous improvement of the PoA management system

Corrective measures will be taken depending on issues raised (e.g. software issues will be corrected by the software developer, operational procedures for the field staff will be modified ad hoc, etc.). In order to identify areas for improvement, besides regular feedback from staff, the following issues will be discussed during Programme Meetings which will be held on a regular basis:

- Any inefficiencies in operation and management (e.g. in recording data or transferring data to database)

- Opportunities to employ better methods
- Control of planned and unplanned changes.
- Any improvements in the management system shall be checked against the PoA-DD and CPA-DDs to ensure there is no conflict.

g) **Other elements:**

N/A

SECTION C. Demonstration of additionality of PoA

>>

As per Tool 32 Version 2 biodigesters up to a capacity of 100 kW are on the positive list and confers automatic additionality. CPA's with digesters larger than 100 kW are not eligible to participate in this PoA, see section J, where the digester capacity is a criterion. Consequently, this PoA is deemed automatically additional (as it was in CPI)

SECTION D. Start date and duration of PoA

D.1. Start date of PoA

>>

The Prior Consideration form for this PoA was submitted to the UNFCCC on 29/08/2013. Hence, this is the start date of the PoA.

D.2. Duration of PoA

>>

28 years

SECTION E. Environmental impacts

E.1. Level at which environmental impacts analysis is undertaken

>>

- ☒ Environmental Analysis is done at PoA level
☐ Environmental Analysis is done at SSC-CPA level

Justification: The environmental analysis is done at PoA level since the host countries have the similar approach to the household sized renewable energy projects:

- a. **Burkina Faso:** As per the Statement from The Ministry of Environment and Sustainable Development, dated on September 23th 2013 to MRA for this Programme of activities confirms that according to Act No. 0006-2013/AN from April 2nd 2013 and the Decree no. 2001342/PRES/PM/MEE from 17th July 2001 neither an environmental impact study nor a notice on environmental impacts have to be carried out.
- b. **Benin:** Article 28 of the Decree no. 2017-332¹² states that projects undertaken for domestic or artisanal purposes, which does not affect sensitive environments or does not generate releases to the environment and Decree No. 2001-235¹³ on operation of environmental impacts study which is exempting household level projects, which do not touch sensible matters or lead to waste, as well as Projects which use natural resources without the construction of infrastructure (meaning roads, plants such as hydro power plants etc).

E.2. Analysis of environmental impacts

>>

Benin and Burkina Faso are energy deficient countries, large part of these countries' energy demands are met through imports. There is therefore an urgent need to develop and provide additional energy resources, particularly to communities whose basic energy needs are currently not being met.

E.3. Environmental impact assessment

>>

Not applicable – as per section E.1, household biogas projects are exempt from EIA.

¹² <https://www.eia.nl/en/countries/benin/esia-profile>

¹³ <https://www.ecolex.org/details/legislation/decret-no-2001-235-portant-organisation-de-la-procedure-detude-dimpact-sur-lenvironnement-lex-faoc030854/?>

SECTION F. Local stakeholder consultation**F.1. Level at which local stakeholder consultation is undertaken**

>>

- ☐ Local stakeholder consultation is done at PoA level
☒ Local stakeholder consultation is done at SSC-CPA level

The local stakeholder consultation will be done at the SSC-CPA level to take into consideration local differences in the host countries.

F.2. Modalities for local stakeholder consultation

>>

Local stakeholder consultation will be done at SSC-CPA level. Summary of comments of each CPA will be provided in CPA-DD.

F.3. Summary of comments received

>>

Local stakeholder consultation will be done at SSC-CPA level. Report on consideration of comments received will be provided in CPA-DD.

F.4. Consideration of comments received

>>

Local stakeholder consultation will be done at SSC-CPA level. Report on consideration of comments received will be provided in CPA-DD.

SECTION G. Approval and authorization

Host country Letters of approval and authorization have been received and are available on the UNFCCC website¹⁴:

- Burkina Faso: 17/03/2014
- Benin: 21/01/2014

It is not required to re-request letters of approval during design renewal.

¹⁴

See

https://cdm.unfccc.int/ProgrammeOfActivities/poa_db/R5G6l8MTCA129VPYQJ0XHNL4ZEDUW/view

Generic component project activity (CPA)

SECTION H. Description of generic CPA

H.1. Title of generic CPA

>>

West Africa Biodigester Generic CPA

H.2. Reference number of generic CPA

>>

CPA with a cardinal number in a chronological order, i.e. CPA-01

H.3. Purpose and general description of generic CPA

>>

Each CPA installs biogas cook stoves supplied by fuel from fixed-dome household biodigesters producing biogas.

These biodigesters (cookstoves with biodigesters) will substitute non-renewable biomass cooking energy sources, produce high quality fertilizer, and contribute to avoidance of methane emissions through changing the management practice of biogenic waste.

Each CPA are Type I - Renewable Energy projects and will be within the small-scale threshold of 45 MW_{th} rated capacity. The average size of the biodigester will be 2.57 kW_{th}, thus each CPA may include ca 17,000 domestic biodigesters.

The biodigesters will be constructed for households which have at least 2 heads of cattle.

Proven in several other countries¹⁵, the technology is robust, reliable and requires little maintenance. The dome concrete – masonry structure can be constructed with locally available materials and skills, and typically has a life of over 20 years.

The biodigesters will be fixed dome plants constructed according to the specifications in the "*Manuel des Constructeurs de Bio digesteurs domestiques*". All the plants will follow the quality standards set by the program in the construction manual. The model was initially designed and developed in Nepal and slightly modified for the local context in West Africa. This model has proven to be reliable, well-functioning, simple, durable and with low maintenance cost.

H.4. Technologies/measures

>>

Technology

The technology used in each CPAs is biogas stoves which are fuelled with biogas produced from manure in fixed dome domestic biodigesters. Previously, non-renewable biomass was used for cooking and the biogenic waste was not managed.

The biodigesters provides biogas to meet the thermal energy needs of households which have at least 2 heads of cattle. Proven in several other countries¹⁶, the technology is robust, reliable and requires little maintenance. The concrete – masonry structure can be constructed with locally available materials and skills, and typically has a life of over 20 years¹⁷.

¹⁵ <http://www.snvworld.org/en/node/1489/> for information on SNV's activities in the domestic biogas sector worldwide.

¹⁶ For information on SNV's activities in the domestic biogas sector worldwide, see: <http://www.snvworld.org>

¹⁷ "Biogas Audit Nepal 2008, Final Version"; KfW Frankfurt/Germany, and USTB Beijing/P.R. China; February 2009

These plants will be fixed dome plants constructed according to the specifications in the *"Manuel des Constructeurs de Bio digesteurs domestiques"*. All the plants will follow the quality standards set by the program in the construction manual. The model was initially designed and developed in Nepal and modified for the local context in West Africa. This model has proven to be reliable, well-functioning, simple, durable and with low maintenance cost.

The biodigesters are based on a uniform technical design and are installed following established technical standards. This model is designed for animal manure as a feed material. So the households feed dung mixed with water into the digester, which through anaerobic digestion produces biogas. The biogas produced in the digester goes to the kitchen through a pipe. The biogas contains around 65% of methane and burns odourless with clear blue flame.¹⁸

The biodigester plant is made up of several interconnected parts. The specific role of each component is summarized below:

- **Inlet** – The main purpose of the inlet is to mix organic material and water into homogenized mixture. This mixture is fed into the digester via an inlet pipe. A manual mixer in the inlet helps mix the organic material and water thoroughly.
- **Digester** – The digester holds the mixture of manure and water while microorganism activity produces biogas in an anaerobic condition. It is cylindrical in shape and is made of brick masonry with a brick masonry dome cover.
- **Dome** - The purpose of the dome is to collect the gas produced in the digester. This is plastered in several layers and painted with a special cement-paint mix in order to make it gas tight. Gas accumulates under the dome creating pressure and pushing down the level of the slurry and increasing the slurry level in the connected slurry tank. It is the difference in slurry levels between the slurry tank and the inside of the dome that provides the pressure to push the gas into the outlet pipe and into the kitchen.
- **The Main Valve** - The main gas valve releases the collected gas under the dome to the biogas stove.
- **Biogas Stove** - Gas is conveyed to the biogas stove in the kitchen in sub-terrain PVC pipes. Biogas produced burns through the biogas stove for cooking purpose.
- **Water Drain** – The water drain is put in at the lowest profile of the PVC pipe conveying gas to the kitchen. Its purpose is to release any condensed water from the pipeline. It needs to be opened periodically to release condensed water.
- **Slurry Outlet Tank** - The slurry outlet tank holds the slurry that the gas pressure from under the dome displaces. This slurry overflows into a composting tank as more manure is fed into the digester. The slurry (bio slurry) can either be used directly as a fertilizer in its liquid form or can be turned more solid after it has been composted with other organic material.

¹⁸ As per performed international tests, documented in *"Popular Summary of the Test Reports on Biogas Stoves and Lamps prepared by testing institutes in China, India and the Netherlands"*, SNV Netherlands Development Organisation; February 2009

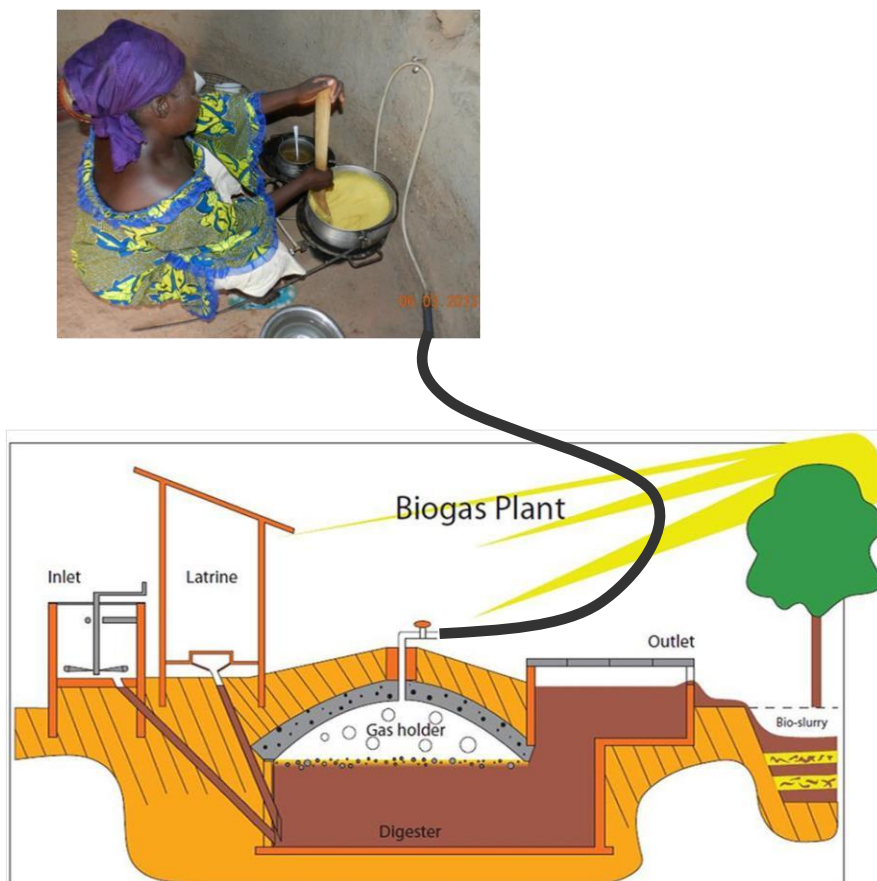


Figure 3: Biodigester implemented in this PoA – biogas stove (top) and a fixed dome biodigester (bottom)

The estimated power output of a system is 2.57 kWh_{th}

2. Non-renewable biomass

All the biogas stoves attached to the biodigesters included in each CPA will replace the use of non-renewable biomass with biogas produced from animal manure.

As per applied methodology, the project participants demonstrate that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports, or statistics.

Demonstration of the NRB in the countries of this PoA:

Burkina Faso: According to the FAO¹⁹, during the period between 1990 and 2010, forest cover has declined at an average of 1% per year and this has continued with 0.9% per year²⁰

Benin: Between 1990 and 2010, Benin lost an average of 60,000 ha or 1.04% per year. In total, between 1990 and 2010, Benin lost 20.8% of its forest cover, or around 1,200,000 ha²¹.

¹⁹ FAO 2010: *evaluation des ressources forestières mondiales 2010. Rapport national Burkina faso*, <http://www.fao.org/docrep/013/al468F/al468f.pdf> and

²⁰ FAO (2018) <http://www.fao.org/3/ca0188en/ca0188en.pdf> page 23

²¹ <https://rainforests.mongabay.com/deforestation/2000/Benin.htm>

SECTION I. Application of methodologies and standardized baselines

I.1. References to methodologies and standardized baselines

>>

AMS-I.E. "Small-scale Methodology: Switch from non-renewable biomass for thermal applications by the user". (v.11.0)

URL: <https://cdm.unfccc.int/methodologies/DB/CU5MMCFAZCZKDP0V9DYAS7VQ56OBJW>

The following tools have been applied

- Tool 30 v.02: Calculation of the fraction of non-renewable biomass²²
- Tool 16 v.4: Project and leakage emissions from biomass²³
- Tool 20 v.04.: Assessment of debundling for small-scale project activities paragraph v.1²⁴
- Tool 32 v. 2.0: Methodological tool: Positive lists of technologies²⁵.
- Tool 21 v.13.1: Demonstration of additionality of small scale project activities²⁶

I.2. Applicability of methodologies and standardized baselines

>>

The applicability of the applied methodology is demonstrated here below:

Table 1: General applicability criteria

No.	General Applicability Criteria	Justification
1	Generation of thermal energy by introducing renewable energy technologies for end users that displace the use of non-renewable biomass. Examples of these technologies include, but are not limited to, cookstoves using renewable biomass, biogas stoves, bio-ethanol stoves, electric cookstoves powered by renewable energy	Each CPA will implement only renewable energy technology – the biodigesters, during every year of the crediting period.

Each CPA to be included in the West African Biodigester PoA meets the applicability criteria of AMS-I.E, as follows:

Table 2: AMS-I.E applicability criteria

No.	Applicability Criteria for AMS-I.E	Justification
-----	------------------------------------	---------------

²² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-30-v2.0.pdf>

²³ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-16-v4.pdf>

²⁴ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf>

²⁵ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-32-v2.0.pdf>

²⁶ <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-21-v13.1.pdf>

1	This category comprises activities to displace the use of non-renewable woody biomass by introducing renewable energy technologies. Examples of these technologies include biogas stoves, solar cookers passive solar homes, renewable energy-based drinking water treatment technologies	The end user technology in this project is cook stoves fueled with biogas from biodigesters which are fed with animal manure, which is a renewable energy source.
2	Project participants are able to show that nonrenewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics.	<p>Burkina Faso: According to the FAO²⁷, during the period between 1990 and 2010, forest cover has declined at an average of 1% per year and this has continued with 0.9% per year²⁸</p> <p>Benin: Between 1990 and 2010, Benin lost an average of 60,000 ha or 1.04% per year. In total, between 1990 and 2010, Benin lost 20.8% of its forest cover, or around 1,200,000 ha²⁹.</p>
3	<p>In the case that technologies using renewable biomass are used under the project activity, this methodology is applicable where all emissions related to processing of biomass are fully accounted for and biomass is sourced from biomass residues and/or a dedicated plantation of the CDM project activity, meeting the following conditions:</p> <ul style="list-style-type: none"> • For projects that use biomass residues, prior to the implementation of the project activity, the biomass residues have not been collected and used but been left for decay and would, in the absence of the project activity, continue to be left for decay; and • For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project does not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs, etc.) or in other substantial changes (e.g. product change) in this process; and • The biomass used by the project facility is not stored for more than one year; and • In the case biomass from dedicated plantations are used, the applicability conditions of TOOL16 "Project and 	This project does not use biomass from dedicated plantations nor residues from plantations. The only source of biomass used is animal manure. Animal manure is not stored for more than a year before feeding but fed on a regular or semi-regular basis (at least once per week)

²⁷ FAO 2010: *evaluation des ressources forestières mondiales 2010. Rapport national Burkina faso*, <http://www.fao.org/docrep/013/al468F/al468f.pdf> and

²⁸ FAO (2018) <http://www.fao.org/3/ca0188en/ca0188en.pdf> page 23

²⁹ <https://rainforests.mongabay.com/deforestation/2000/Benin.htm>

	leakage emissions from biomass” are satisfied.	
4	The following further conditions apply for the fNRB value applied in a component project activity (CPA) of a PoA. The choice between (a) conduct own studies to determine the local fNRB value as per “TOOL30 v.2: Calculation of the fraction of non-renewable biomass” and then apply those values in the CPAs; and (b) use default national values approved by the Board shall be made ex ante. A switch from national value i.e. choice (b) to local values i.e. choice (a) is permitted, under the condition that the selected approach is consistently applied to all CPAs.	The CPAs under this PoA can apply either a national default value or calculate the fNRB value as per tool 30 v.2
5	For electric cookstoves with integrated renewable energy device or with grid connected renewable energy system employing net metering, project participants shall demonstrate that, on an annual basis, at least 80% of the electricity generated is consumed by the electric cook stoves (i.e. 20% or less of electricity is consumed by other loads connected).	N/A the project installs biodigesters
6	For electric cook stoves, in all cases under paragraph 2(d) above where back-up diesel generators are used, this methodology is only applicable when no more than 1% of total electricity supply occurs from back up diesel generators on an annual basis.	N/A the project installs biodigesters
7	Under this methodology, emission reductions cannot be claimed only due to fuel-switch aspect and proposed project activities shall introduce new renewable energy based technologies, i.e. technology switch is also involved.	New renewable energy technologies are introduced: biodigesters in which biogas is generated from animal manure.
8	Project participants shall describe in the PDD/PoA-DD the proposed method for distribution of project devices and how the double counting of emission reductions has been addressed, for example, using methods such as unique identifications of product and end-user locations (e.g. programme logo), to prevent double counting of emission reductions from the project devices (e.g. between end users, distributors and producers of stoves, producers of renewable energy, producers of processed renewable biomass).	The procedure to avoid double counting is part of the PoA management system. Section B item d in this PoA-DD discusses the system to prevent double counting.
9	For project activities introducing bio-ethanol cookstoves, project participants shall demonstrate that the bioethanol cookstoves are designed, constructed and operated to the requirements (e.g. with regard to safety) of a relevant national or local standard or comparable literature. Latest guidelines issued by a relevant national authority or an international organisation may also be used.	N/A the project installs biodigesters
Applicability criteria pertinent to Project activity under a programme of activities (paragraph 49-51)		

10	<p>The use of this methodology in a project activity under a programme of activities (PoA) is legitimate if the following leakages are estimated and accounted for, where applicable, on a sample basis using a 90/30 precision for the selection of samples, and accounted for:</p> <ul style="list-style-type: none"> a) Use of non-renewable woody biomass saved under the project activity to justify the baseline of other CDM project activities can also be a potential source of leakage. If this leakage assessment quantifies a portion of non-renewable woody biomass saved under the project activity that is then used as the baseline of other CDM project activities, then By is adjusted to account for the quantified leakage; b) Increase in the use of non-renewable woody biomass outside the project boundary to create non-renewable woody biomass baselines can also be a potential source of leakage. If this leakage assessment quantifies an increase in the use of nonrenewable woody biomass outside the project boundary, then By is adjusted to account for the quantified leakage; c) As an alternative to subparagraphs (a) and (b) above, By can be multiplied by a net to gross adjustment factor of 0.9513 to account for leakages, in which case surveys are not required. 	<p>Leakage in each CPA is estimated and accounted for in accordance with the paragraph 49 c of the methodology. The CPAs under this PoA will adjust the By with a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required.</p>
10	<p>The following further conditions apply for the fNRB value applied in a component project activity (CPA) of a PoA. The choice between (a) conduct own studies to determine the local fNRB value as per "TOOL30 v.2: Calculation of the fraction of non-renewable biomass" and then apply those values in the CPAs; and (b) use default national values approved by the Board shall be made ex ante. A switch from national value i.e. choice (b) to local values i.e. choice (a) is permitted, under the condition that the selected approach is consistently applied to all CPAs.</p>	<p>The CPAs under this PoA can apply either a national default value or calculate the fNRB value as per tool 30 v2.0</p>
11	<p>If the generic CPA consists solely of units that qualify as "microscale CDM units"¹⁸ as defined in the "TOOL19: Demonstration of additionality of microscale project activities", the conditions to ensure that CPAs that will be included meet the small-scale or microscale thresholds and remain within those thresholds throughout the crediting period of the CPAs are not required.</p>	<p>N/A this CPA's under this PoA are small-scale</p>

The applicability of the applied tools are demonstrated here below:

Tool 20 v.4.0. applicability

- As per paragraph 20, this tool is applicable to small-scale project activities and small-scale CPA's. The CPA's under this PoA are small-scale and therefore this tool is applicable

Tool 16 v. 4

- As discussed in table 2 this tool is not applicable because cultivation of biomass does not occur nor are biomass residues used or cultivated in a dedicated plantation. The feedstock of biodigesters is animal manure, which originate from the animals kept at the household. Manure is not transported or processed to the household plant using energy or fossil fuels.

Tool 21 v.13.1

- As per AMS-I.E v.11.0 provides an option to use this tool in paragraph 22. This option is used by the CME to assess additionality.

Tool 30 v.3.0 applicability

- As per paragraph 4.b this tool is to be used by project participants to calculate project or PoA specific fNRB values. In this PoA the fNRB is calculated by the project participant at CPA level and thus this tool is applicable

Tool 32 v.2.0 applicability

- As per paragraph 5 this tool shall be applied in conjunction with a small-scale or large-scale methodology which refers to this too. As per AMS-I.E v.11.0 provides an option to use Tool 21 in paragraph 22. Tool 32 was used an option to demonstrate additionality as referenced in tool 21 v.13.1 paragraph 8(c) and in Figure 1 as option.

I.3. Application of multiple methodologies

>>

N/A – only 1 SSC methodology is applied

I.4. Project boundary, sources and greenhouse gases (GHGs)

Under this project, the physical locations of the biodigesters -the biodigesters fuelling the household cook stove delineate the project boundary.

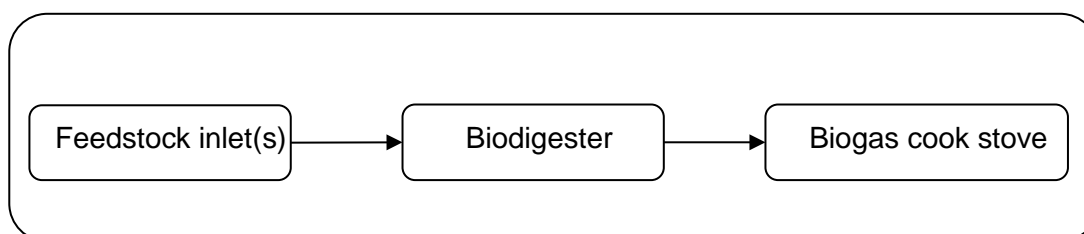


Figure 4: Biodigester system project boundary

Table 3: Emission Sources/Gases included or excluded in the project boundary

	Source	Gas	Included?	Justification/Explanation
Baseline	Thermal energy need	CO ₂	Yes	Major source of emissions

		CH ₄	Yes	Major source of emissions
		N ₂ O	Yes	Major source of emissions
Project activity	Emissions from the biodigesters	CO ₂	No	Excluded as CO ₂ emissions from biogas incineration are CO ₂ neutral
		CH ₄	No	Excluded, as the CH ₄ will be incinerated in the stoves and the leaks are very small

1.5. Establishment and description of baseline scenario

>>

As per the AMS-I.E “Switch from Non-Renewable Biomass for thermal applications by the user”, it is assumed that in the absence of the project activity, the baseline scenario would be the use of fossil fuels for meeting similar thermal energy needs.

Households in Burkina Faso and Benin are mainly using woody biomass for cooking. The baseline emissions are estimated as emissions from substituting the displaced fraction of non-renewable woody biomass by fossil fuel; using the emission factor for the substitution of non-renewable woody biomass by similar consumers: 73.2 tCO_{2e}/TJ for sub-Saharan Africa or by calculating an EF using equation 2 in section 1.6.1.

Detailed Baseline Data will be provided in each CPA.

In order to operate a domestic biodigester to produce biogas for cooking, a minimum of two heads of cattle or 5 adult pigs to produce the required minimum of 20 kg dung per day is needed. The size of the biodigester installed depends on the available manure and hence heads of cattle belonging to the household. Prior to construction, this data is checked. For ex-ante calculations and to be conservative, a minimum number of two heads of cattle are assumed, if not more detailed information is available on CPA-level.

The regulatory framework in Burkina Faso and Benin has not changed since the first crediting period:

Benin:

Benin National Renewable energy plan (Plan d'Action National des Energies Renouvelables (PANER), 2015-2020/203030

- Promotion of digesters as priority action as modern fuel and alternative to traditional cooking (p55)
- Bio-energy policies in Benin, 2014 (LES POLITIQUES PUBLIQUES BIOENERGIE AU BENIN³¹)
 - P13 – biodigesters is promoted to reduce wood demand

Burkina Faso:

³⁰ https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_PANER/Benin_Plan_d_Actions_National_pour_les_Energies_Renouvelables__PANER_.pdf

³¹ http://jatroref.iram-fr.org/IMG/pdf/synthese_politiques_benin.pdf

- National Renewable Energies Action Plan³²: Plan d'Action National des Energies Renouvelables (PANER) Burkina Faso Période (2015-2020/2030) Aims to achieve 38,000 digesters by 2030 (p33)

In both countries biogas continues to be promoted to address energy poverty, reduce deforestation and improve soil quality. There are no laws mandating the adoption of biodigesters, it remains a voluntary activity.

I.6. Estimation of emission reductions

I.6.1. Explanation of methodological choices

>>

This PoA aims to promote biogas stoves which are fuelled with biogas from biodigesters that replace the use of non-renewable biomass for cooking purposes.

1. Baseline emissions

The baseline emissions of a CPA are calculated as per the guidance of the methodology AMS I.E.

$$BE_{CPA,y} = B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

Equation (1)

Where:

$BE_{CPA,y}$	=	Baseline emissions under the CPA during the year y (tCO ₂ e)
B_y	=	Quantity of woody biomass that is substituted or displaced (tonnes/year)
$f_{NRB,y}$	=	Fraction of woody biomass used in the absence of the project activity in year y that can be established as non-renewable biomass (f_{NRB})
$NCV_{biomass}$	=	Net calorific value of the non-renewable biomass that is substituted (IPCC default for wood fuel: 0.0156 TJ/tonne)
$EF_{projected_fossil fuel}$	=	Emission factor for the substitution of non-renewable woody biomass by similar consumers.

For the emission factor for the substitution of non-renewable woody biomass by similar consumers, either the default regional values (73.2 tCO₂e/TJ for sub-Saharan Africa³³) or project participants may estimate the emission factor for the substitution of non-renewable woody biomass by similar consumers³⁴ for their project or PoA by applying equation (2) below:

³² https://www.se4all-africa.org/fileadmin/uploads/se4all/Documents/Country_PANER/Burkina_Faso_Plan_d_Actions_National_pour_les_Energies_Renouvelables.pdf

³³ As per table 2 in AMS-I.E v.11.0

³⁴ The use of electricity together with the related grid emission factor shall be considered unless its share is less than 5%, in which case it may be disregarded for calculation of the fuel emission factor.

Equation (2)

$$EF_{projected_fossil\ fuel} = \sum_j \{x_j \times (EF_{FF,j,CO_2} + EF_{FF,j,CH_4} \times GWP_{CH_4} + EF_{FF,j,N_2O} \times GWP_{N_2O})\}$$

Where:

- x_j = Percentage share of fossil fuel use³⁵ (a fraction representing the share of fossil fuel type j in total fossil fuel used in the region/country or project area for cooking)
- EF_{FF,j,CO_2} = CO₂ emission factor for the fossil fuel j . (t CO₂/TJ)
- EF_{FF,j,CH_4} = CH₄ emission factor for the fossil fuel j . (t CH₄/TJ)
- EF_{FF,j,N_2O} = N₂O emission factor for the fossil fuel j . (t N₂O/TJ)
- GWP_{CH_4} = Global Warming Potential of CH₄ valid for the commitment period
- GWP_{N_2O} = Global Warming Potential of N₂O valid for the commitment period

The following default emission factors will be used:

Table 4: Default emission factors (kg of GHG per TJ on a Net Calorific Basis)

Fuel	Default CO ₂ Emission Factor	Default CH ₄ Emission Factor	Default N ₂ O Emission Factor
Kerosene	71,900	10	0.6
Liquefied Petroleum Gases (LPG)	63,100	5	0.1
Coal	94,600	300	1.5

B_y is determined by using one of the following options:

- Calculated as the product of the number of households multiplied by the estimate of average annual consumption of woody biomass per household that is displaced by the project activity (tonnes/household/year);

$$B_y = N_{HH,y} \times (BC_{BL,HH} - BC_{PJ,HH,y})$$

³⁵ For example, percentage share of kerosene, LPG and coal in total fossil fuel used in the country X is 10%, 70% and 20%, then the parameter value for x_j should be 0.1, 0.7 and 0.2 respectively.

Equation (3)

Where:

$N_{HH,y}$	=	Number of households with functional cookstoves distributed under the project activity in year y (number)
$BL_{BL,HH}$	=	Average annual consumption of woody biomass per household before the start of the project activity or at the renewal of each crediting period, whichever is later (tonnes/household/year)
$BC_{PJ,HH,y}$	=	Average annual consumption of woody biomass per household in the pre-project devices during the project activity (tonnes/household/year). This parameter shall be considered if it is found that pre-project devices were not completely displaced but continue to be used to some extent

- Calculated as the product of the number of persons served per household multiplied by the number of households and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

$$B_y = N_{HH,y} \times N_{p,HH} \times (BL_{BL,PP} - BC_{PJ,PP,y})$$

Equation (4)

Where

$N_{p,HH}$	=	Average number of persons served per household, number
$BL_{BL,HH,y}$	=	Average annual consumption of woody biomass per person before the start of the project activity or at the renewal of each crediting period whichever is later (tonnes/person/year)
$BC_{PJ,PP,y}$	=	Average annual consumption of woody biomass per person in the pre-project devices during the project activity (tonnes/person/year). This parameter shall be considered if it is found that pre-project devices were not completely displaced but continue to be used to some extent.

- Calculated as the product of the number of persons served per institution³⁶ multiplied by the number of institutions and the estimate of average annual consumption of woody biomass per person that is displaced by the project activity (tonnes/person/year);

$$B_y = \sum_{i=1}^n N_{IN,y} \times N_{p,IN,y} \times (BC_{BL,PP} - BC_{PJ,PP,y})$$

³⁶ Institutions such as schools, prisons and hospitals.

Where:

$Np_{IN,y}$	=	Average number of persons served per institution in year y (number)
$N_{IN,y}$	=	Number of institutions with functional cookstoves distributed under the project activity in year y (number)

- Calculated from the thermal energy generated in the project activity as:

$$B_y = \sum_i^n HG_{p,y,i} \div (NCV_{biomass} \times \eta_{bl})$$

Where:

$HG_{p,y,i}$	=	Quantity of thermal energy generated by the new renewable energy technology in the project in year y (TJ)
--------------	---	---

HG shall, for a biogas digester, it shall be monitored as per the requirements stipulated in the Table 1 of AMS-I.I Biogas/biomass thermal applications for households/small users. Alternatively, project proponents may use a default biogas generation value of 0.13 Nm³ .m⁻³ .day⁻¹ (i.e. volume of biogas generated in normal conditions of temperature and pressure per unit useful volume of the digester per day) for regions/countries where annual average ambient temperature is higher than 20°)

η_{bl}	=	Efficiency of pre - project device per type of device <i>i</i> <i>Efficiency of the system being replaced, measured using representative sampling methods or based on referenced literature values (fraction), use weighted average values if more than one type of system is being replaced.</i>
-------------	---	--

A default value of 0.10 may be optionally used if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney; for other types of systems a default value of 0.2 may be optionally used

Where charcoal is used as the fuel by baseline (old) or project (new) devices, the quantity of woody biomass shall be determined by using a default wood to charcoal conversion factor of 6 kg of firewood (wet basis) per kg of charcoal (dry basis)³⁷. Alternatively, credible local conversion factors determined from a field study or literature may be applied.

For both the option a,b,c,d the B_y will also be adjusted for plants constructed and operational for less than a year since not all the biodigesters will be constructed in 1st month of any year. Construction will be ongoing, and plants will be added every month. Thus, the plants constructed in January will be operational for 11 months of that year, the plants constructed in February will be operational for 10 months of that year and so on. B_y will be adjusted in pro rata basis for such plants. Number of

³⁷ Refer to: <<http://www.ipcc-nggip.iges.or.jp/public/gl/guidelin/ch1ref3.pdf>>. The term 'wet basis' assumes that the wood is 'air-dried' as is specified in the IPCC default table.

biodigesters included in the monitoring period and are operational for one year (N) will be calculated with the following formula:

$$N_{HH,y} = \sum_{M=1}^n i_j \times j/12$$

Equation (7)

i_j	N_m	=	Number of biodigesters in use for „M“ months during the monitoring period. N_M will be considered from the plants installed in the monitoring period and previous monitoring periods.
j	M	=	Number of months that the plants are in use during the monitoring period (M=1,2,3,n)

Thus as per methodology paragraph 15, the ERs are calculated based on batches of 1 months, where the latest date of a calendar month is used as start date of the ER generation.

2. Project emissions

Potential project emissions sources mentioned in chapter 5.4 of the applied methodology are not applicable. The PoA and its CPA's are not involved in the cultivation and processing of biomass

3. Leakage

Paragraph 39 of the methodology specifies that leakage emissions (related to the non-renewable woody biomass saved by the project activity shall be assessed based on ex post surveys of users and the areas from which this woody biomass is sourced (using 90/30 precision for a selection of samples). The following potential source of leakage are considered:

- The use/diversion of non-renewable woody biomass saved under the project activity by non-project households/users that previously used renewable energy sources.

If this leakage assessment quantifies an increase in the use of non-renewable woody biomass used by the non-project households/users that is attributable to the project activity, then B_y is adjusted to account for the quantified leakage. Alternatively, B_y is multiplied by a net to gross adjustment factor of 0.95 to account for leakages, in which case surveys are not required. In this PoA, the CPA's will apply the net to gross adjustment factor of 0.95 to account for leakage.

4. Emission reductions

The emission reductions will then be calculated with the following equation:

$$ER_{CPA,y} = 0.95 \times N_{HH} \times B_y \times f_{NRB,y} \times NCV_{biomass} \times EF_{projected_fossilfuel} \times P$$

Equation (8)

Where P = the average operation rate

B_y will be calculated with by option a,b,c or d, or a combination of the options depending on the circumstances in a CPA.

1.6.2. Data and parameters fixed ex ante

(Copy this table for each piece of data and parameter.)

Data / Parameter	$NCV_{biomass}$
Unit	TJ/tonne
Description	Net calorific value of the non-renewable biomass that is substituted
Source of data	IPCC default for wood fuel
Value(s) applied	0.0156
Measurement procedures (if any):	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	-

Data / Parameter	$EF_{projected_fossil\ fuel}$
Unit	tCO ₂ /TJ
Description	Emission factor for the substitution of nonrenewable woody biomass by similar consumers.
Source of data	AMS I.E v.11.0 table 2
Value(s) applied	73.2
Measurement procedures (if any):	Default value for sub-Saharan Africa This value represents the emission factor of the substitution fuels likely to be used by similar users, on a weighted average basis.
Purpose of data	Calculation of baseline emissions
Additional comment	At CPA level either the default is applied, or the EF is calculated using equation 2 of the applied methodology

Data / Parameter	$HG_{p,y,i}$
Unit	TJ
Description	Quantity of thermal energy generated by the new renewable energy technology in the project in year y

Source of data	Methodology AMS I.E If option (d) is used to calculate B_y
Value(s) applied	0.13 Nm ³ .m ⁻³ .day ⁻¹
Measurement procedures (if any):	Default value
Purpose of data	Calculation of baseline emissions
Additional comment	Represents volume of biogas generated in normal conditions of temperature and pressure per unit useful volume of the digester per day) for regions/countries where annual average ambient temperature is higher than 20°C, as per the methodology

Data / Parameter	η_{bl}
Unit	Fraction
Description	Weighted average efficiency of pre-project device
Source of data	Methodology AMS I.E If option (d) is used to calculate B_y
Value(s) applied	<ul style="list-style-type: none"> 0.10 - if the replaced system is a three stone fire, or a conventional system with no improved combustion air supply or flue gas ventilation system, i.e. without a grate or a chimney. 0.2 - for other types of systems
Measurement procedures (if any):	<p>The parameter may be established based on a representative sample survey of the pre-project devices and fixed ex ante (i.e. there is no need to determine baseline efficiency for each individual household when including in the project activity database). The survey is to be conducted in line with the “Standard for sampling and surveys for CDM project activities and programmes of activities”.</p> <p>The representative sampling survey may ask whether the pre-project device is a traditional three-stone fire or another conventional device with no improved combustion air supply or flue gas ventilation.</p>
Purpose of data	Calculation of baseline emissions
Additional comment	In case the option from paragraph <input type="checkbox"/> above is chosen for baseline calculations

Data / Parameter	$BC_{BL,HH}$
Unit	tonnes/household/year
Description	Average annual consumption of woody biomass per household before the start of the project activity or at the renewal of each crediting period, whichever is later
Source of data	Surveys or studies
Value(s) applied	Variable, to be fixed in each country upon inclusion of the first CPA , if option a is used to calculate B_y

Measurement procedures (if any):	<p>Determined ex ante using one of the following options:</p> <p>(a) $N_{p,HH}$ times $BC_{BL,PP}$; or</p> <p>(b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities;”</p> <p>(c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines”, which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html</p>
Purpose of data	Calculation of baseline emissions
Additional comment	<p>When conducting the survey, project participants should take into account the following considerations:</p> <ul style="list-style-type: none"> • Direct measurement of the use of each fuel in the field (e.g. weighing the amount of woody biomass, metering LPG) is more accurate and is the preferred option; In exceptional circumstances alternative less preferred method such as the one below based on number of meals cooked may be accepted subject to satisfactory justifications provided (e.g. fuel use varies according to season, price or availability of the respective fuel and reliable information on amount spent on fuel purchase is available). • Asking the number of meals cooked with each fuel or the number of times each fuel is used to cook in a certain period in a questionnaire-based survey may be used for estimating the proportion of the baseline fuels displaced. <p>The project participants should demonstrate the actual implementation of sampling approach to estimate the proportion of baseline fuels displaced and its compliance with the reliability requirements (i.e. confidence/precision) according to “Standard: Sampling and surveys for CDM project activities and programme of activities”</p>

Data / Parameter:	$BC_{BL,PP}$
Data unit:	tonnes/person/year
Description:	Average annual consumption of woody biomass per person before the start of the project activity or at the renewal of each crediting period, whichever is later
Source of data:	Variable, to be fixed in each country upon inclusion of the first CPA, if option b is used to calculate B_y
Measurement procedures (if any):	<p>Determined ex ante using one of the following options:</p> <p>(a) A default value of 0.5 tonnes/person per year³⁸;</p> <p>(b) Historical data or a sample survey conducted as per the latest version of the “Standard: Sampling and surveys for CDM project activities and programme of activities v8.0;”</p> <p>(c) Country or region specific values approved through the “procedure for development, revision, clarification and update of standardized baselines,” which are available on the CDM website http://cdm.unfccc.int/methodologies/standard_base/index.html</p>
Purpose of data	Calculation of baseline emissions
Any comment:	This parameter may or may not be reported according to the option selected at CPA level for the estimate of emission reductions.

³⁸ Refer to “Annex 5 - Information note on the rationale for default factors used in AMS-I.E. and AMS-II.G.” of the SSC WG 42 meeting report.

Data / Parameter	Net to Gross Adjustment Factor
Unit	-
Description	Use/diversion of non-renewable woody biomass saved by the project activity by non-project households/users that previously used renewable energy sources.
Source of data	Methodology AMS I.E
Value(s) applied	0.95
Measurement procedures (if any):	Default, as guided by the methodology
Purpose of data	Calculation of leakage
Additional comment	-

I.6.3. Modalities for ex ante calculation of emission reductions

>>

The emission reductions under a CPA are calculated as per the guidance of the methodology AMS I.E option b in this section. The approach of option b is similar to option a with the exception that in option b the fuel consumption per household are calculated on a per person basis vis-à-vis on a per household basis in option a.

Example of calculation of emission reductions of 1 plant:

Assumptions:

- Calculation of 1 biodigester; $N_{i,y}=1$
- Plant is operational for 12 months of year in a monitoring period; $M=12$
- Operational percentage is assumed as 100% for example calculation.; $P=100\%$ (Actual operational percentage will be used during the emission reduction report preparation.)
- Household size: 11.30³⁹
- $BL_{BL,PP,y}$: Woody biomass consumption per hh member: 0.5 (CDM default)
- $BC_{PJ,PP,y}$: Quantity of wood used by a household in the project situation; 1.12³⁹
- $f_{NRB,y,Burkina\ Faso} = 86.34\%$
- $NCV_{biomass} = 0.0156$ TJ/tonne (IPCC default for wood fuel:)
- $EF_{projected_fossil\ fuel} = 73.2$ tCO₂/TJ (as per the methodology)
- Leakage: 0.95

Applying equation (7):

$$N_{HH} = \sum_{j=1}^n i_j \times j/12$$

$$i_j = 1$$

$$j = 12$$

$$N_{HH} = 1 \times 12/12 = 1$$

Applying equation (3) – this equation is slightly modified for the fact that project fuel consumption is not measured on a per capita basis.

$$B_y = N_{HH,y} \times (N_{p,HH} \times BL_{BL,PP,y}) - BC_{PJ,PP,y}$$

³⁹ MPIII CPI survey

$$B_y = 1000 * (11.3 * 0.5) - 1.12$$

$$\underline{B_y = 4.53 \text{ tonnes/year}}$$

Applying equation (8):

$$ER_{CPA,y} = 0.95 \times B_y \times fNRB_y \times NCV_{biomass} \times EF_{projected_fossilfuel}$$

$$ER_{CPA,y} = 0.95 \times 4.53 \text{ tonnes/year} \times 86.43\% \times 0.015 \text{ TJ/tonne} \times 73.2 \text{ tCO}_2\text{e/TJ}$$

$$ER_{CPA,y} = 4.239 \text{ tCO}_2\text{e}$$

I.7. Monitoring plan**I.7.1. Data and parameters to be monitored**

(Copy this table for each piece of data or parameter.)

Data / Parameter	Date of commissioning of project device of type i
Unit	Date
Description	Actual date of commissioning of the project device.
Source of data	Plant completion form, derived from records
Value(s) applied	-
Measurement methods and procedures	The CME and CPA implementer keep a paper and electronic record of the installed systems.
Monitoring frequency	annual
QA/QC procedures	Records will be scrutinized by the CPA implementer to avoid double-counting and the CME will also conduct spot-checks to verify the legitimacy of such records. This will be undertaken by telephone on receipt of new records by the CME and annually with site visits.
Additional comment	-

Data / Parameter	Date of commissioning of batch j
Unit	months
Description	number of months that the plants are in use during the monitoring period
Source of data	Plant completion form and database
Value(s) applied	(j=1,2,3,n)
Measurement methods and procedures	Not all the biodigesters will be constructed in 1 st month of any year. Construction will be ongoing and plants will be added every month. The database contains the information on plant completion date sourced from the plant completion form.
Monitoring frequency	Annual
QA/QC procedures	-
Additional comment	

Data / Parameter	P
Unit	%

Description	Operational percentage of the biodigesters in the monitoring period (this will be estimated from the biogas users survey. „P“ will be estimated from all the biodigesters)
Source of data	Annual Biogas User Survey
Value(s) applied	-
Measurement methods and procedures	The CME will arrange for conduct the annual biogas user survey. Operational plants will be identified by asking the sample households if the plant installed in his/her house is producing gas regularly or not. This survey will also include questions to identify the users' satisfaction and the performance of the biodigester.
Monitoring frequency	annual
QA/QC procedures	CME will also conduct spot-checks to verify the legitimacy of reports. This will be undertaken by telephone on receipt of new records by the CME and annually with site visits.
Purpose of data	Calculation of project emissions
Additional comments	-

Data / Parameter:	$BC_{PJ,HH,y}$
Data unit:	tonnes/household/year
Description:	Average annual consumption of woody biomass per household in the pre-project devices during the project activity in year y
Source of data:	Surveys
Measurement procedures (if any):	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial)
Monitoring frequency:	At least once every two years (biennial)
QA/QC procedures:	-
Any comment:	

Data / Parameter:	$BC_{PJ,PP,y}$
Data unit:	tonnes/person/year
Description	Average annual consumption of woody biomass per person in the pre-project devices during the project activity during year y
Source of data:	Surveys
Measurement procedures (if any):	Monitoring shall consist of estimation of all project devices or a representative sample thereof, at least once every two years (biennial) Households will be asked how much fuel (wood or charcoal) they continue to use on a daily basis for cooking next to biogas
Monitoring frequency:	At least once every two years (biennial)
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Any comment:	Fuel consumption will be monitored of pre-project devices during normal circumstances. Normal circumstances are defined as fuel used to meet the day to day cooking requirements of the family in representative situation without out of the ordinary circumstances such as festivals, extra eaters (i.e. visitors), new-born babies (extra wood is used for heating water), fuel used for commercial purposes (small shops) etc.

Data / Parameter:	$N_{p,IN,y}$
Data unit:	Number
Description:	Average number of persons served per institution
Source of data:	Surveys
Measurement procedures (if any):	Average number of persons served per institution shall be based on survey undertaken as per "Standard: Sampling and surveys for CDM project activities and programme of activities v8.0". This parameter shall be monitored every year. If the monitoring period is shorter or longer than one year, the result may be extrapolated for the monitoring period
Monitoring frequency:	Monitored annually ex post
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Any comment:	-

Data / Parameter:	$N_{p,HH}$
Data unit:	Number
Description:	Average number of persons served by the technology If option b is used to calculate B_y
Source of data:	Surveys
Measurement procedures (if any):	Average number of persons served shall be based on survey undertaken as per "Standard: Sampling and surveys for CDM project activities and programme of activities v8.0". This parameter shall be monitored every year. If the monitoring period is shorter or longer than one year, the result may be extrapolated for the monitoring period
Monitoring frequency:	Monitored annually ex post
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Any comment:	

Data / Parameter:	$HG_{p,y,i}$
Data unit:	TJ
Description:	Quantity of thermal energy generated by the new renewable energy technology i in the project in year y
Source of data:	-

Measurement procedures (if any):	<p>For a biogas digester, it shall be monitored as per the requirements stipulated in the Table 1 of “AMS-I.I.: Biogas/biomass thermal applications for households/small users”. Alternatively, project proponents may use a default biogas generation value of $0.13 \text{ Nm}^3 \cdot \text{m}^{-3} \cdot \text{day}^{-1}$ (i.e. volume of biogas generated in normal conditions of temperature and pressure per unit useful volume of the digester per day) for regions/countries where annual average ambient temperature is higher than 20°C.</p> <p>For the case of ethanol cookstoves, the related requirements from AMS-I.I. for determining thermal energy generated in the case of processed renewable biomass (refer to paragraph 13 of the methodology version 4.0) may be adopted. The preferred approach to determine the thermal energy output of the stoves would be through monitoring the amount of ethanol used for cooking by the households (if required, on a sample basis), the NCV and density of the ethanol, and the efficiency of the project stoves determined according to the requirements of AMS-II.G.: Energy efficiency measures in thermal applications of non-renewable biomass for $\eta_{\text{new},ij}$. The manufacturers rated thermal capacity of the stoves and the monitored utilization hours entails uncertainties since e.g. stoves may be operating at partial capacity. Therefore, for this option, it may be necessary to determine the average capacity utilization of stoves through surveys.</p>
Monitoring frequency:	Yearly
QA/QC procedures:	-
Purpose of data	Calculation of project emissions
Any comment:	Applicable if the option from paragraph <input type="checkbox"/> above is chosen for baseline calculations

I.7.2. Sampling plan

>>

The programme will conduct the annual monitoring to find out the annual performance of the biodigesters installed by selecting the representative samples of the installed and operated biodigesters in the specific monitoring period.

Target Population and sampling frame

The total number of plants installed and operated in that monitoring period will be the total sampling frame. Out of these plants' samples will be selected.

Sample size and method

The required sample size will be determined using simple random sampling. Number of biodigesters operational for “M” months (during the monitoring period) will be sourced from the plant completion forms.

The sample size is determined using the Standard for sampling and surveys for CDM project activities and programme of activities. As required by AMS-I.E for annual surveys, the level of precision will be 90/10. (90% confidence interval and 10% margin of error) or 95/10 in case of biennial monitoring.

The minimum sample size to obtain operational biodigesters is calculated using the equation for simplified random sampling as per the “Guideline on Sampling and surveys for CDM projects activities and programmes of activities”, using:

$$n \geq \frac{1.645^2 N \times p(1-p)}{(N-1) \times 0.1^2 \times p^2 + 1.645^2 p(p-1)}$$

Equation (9)

Where:

n	=	Sample size
N	=	Total number of biodigesters (varying across CPA and monitoring periods)
p	=	representing 90% confidence interval
p	=	Level of precision, 10% for annual or 5% for biennial sampling

Example sample size calculation based on the following assumption:

Table 5: Calculated sample size with N=10000

Monitoring interval	N	Calculated n	n with 10% oversampling
Yearly	10000	43	47
Biennial	10000	170	187

In order to anticipate any low response rate and answers bias, 10% oversampling has been applied, giving a minimum sample size of **47 or 187** retained for the monitoring surveys depending on the monitoring interval. Yet, answered survey forms from at least 43 or 170 households will be aimed at respectively

I.7.3. Other elements of monitoring plan

>>

All the CPAs will follow the same monitoring methodology as described in this PoA-DD:

Data on the biodigesters are recorded in the field by BCCs and by CPA implementer's personnel and reported to the CPA implementer.

1. Mandatory data to be collected include:

- Name of customer
- Address/location
- Phone number (if available) Unique identification code of the biodigester (code generation described in the CPA-DD)
- Biodigester model and size (defining the installed capacity)
- Date of commissioning
- Identification of BCC
- Name of CPA implementer (NBP)

2. CPA implementer keeps the records and enters the data to the CPA database. The CPA implementers will maintain records on end user contact information, construction date and other inventory information in a manner that enables the CME and DOE to verify that construction is

indeed occurring and biodigesters are being used by households within the border of the host countries that results in a decrease in greenhouse gas emissions.

- a. Before recording the biodigester into the CPA database, the identification code will be cross- referenced to guarantee that no double counting has occurred.
 - b. In order to confirm the displacement of non-renewable woody biomass, only the plant where the household was using non-renewable woody biomass for cooking in the baseline situation will be included in the CPA. This will be confirmed in the prior construction form for each of the households.
3. The CPA implementer will keep the CPA database up to date at least annually by checking all the biodigesters or a representative sample thereof.
 4. If sampling is applied, it will be in accordance with eligibility criterion (j).
 5. The main variable that will be monitored is the proportion of biodigesters that have been operational and in use over the monitoring period. Operational plants will be identified by asking the sample households if the plant installed in his/her house is producing gas regularly or not. The number of total installed plants will be multiplied by the percent of operational plants to get the actual number of operational plants in that monitoring period.
 6. The CPA implementers will report the data to CME as per conditions set in the contractual agreements.

SECTION J. Crediting period type and duration

>>

Type:	Renewable
Duration:	7 years and 00 months
Maximum number of design renewal:	2

SECTION K. Eligibility criteria for inclusion of CPAs

>>

Each CPA will meet the eligibility criteria set in the section B.2 of Part I of this PoA-DD. Means of proof/evidence document to be checked at CPA inclusion are described below.

Table 6: Demonstration of eligibility for inclusion of CPA

Ref	Eligibility Criteria		Eligibility Criteria
	Category	Description	
(a)	Geographical Boundary	All cookstoves supplied by biogas from biodigesters listed in the CPA will be located in Benin or Burkina Faso. Project boundary of each CPA will be the physical, geographical site of the installed biodigesters (biodigesters and biogas cookstoves).	Location and boundary are specified in the specific CPA-DD stating that the location of each biodigester in the CPA is limited to Burkina Faso or Benin, <u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> Statement of CME that the location and boundary is within Burkina Faso or Benin
(b)	Double counting	All CPAs will be checked to prevent double counting and are not registered as a separate CDM project activity, nor as part of another registered CDM PoA.	A statement is included in the CPA-DD that the specific CPA will not be part of another single CDM project activity or CPA under another PoA <u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> <input type="checkbox"/> UNFCCC website, UNEP Risoe
(c)	Technology	The applied technology involves the dissemination of gas cookstoves supplied by fuel from fixed-dome household biodigesters producing biogas for cooking purposes. All the biogas cookstoves with biodigesters included in each CPA will replace the use of nonrenewable biomass. The biodigesters will be of fixed dome design constructed as per the specifications and quality guidelines in the NBP " <i>Manuel des Constructeurs de Bio digesteurs domestiques</i> ", or digesters with equivalent performance (i.e. prefabricated digesters)	All the biodigesters supplying biogas to the cookstoves will follow the quality standards set by the program in the construction manual. As guided by the construction Manual, the Biogas Construction Companies (BCC) fill out: <ul style="list-style-type: none"> Prior construction survey form to confirm the household uses biomass for cooking before the installation of biodigester, and the plant Completion form, and submit them to the respective National Biodigesters Programme. NBP's technicians visit the sample plants for quality control to ensure that the plants are built as per the prescribed quality standards and fill in the Quality Control Form Only the biodigesters passing the criteria will be entered into the CPA database by the CPA implementer <u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> CPA database

(d)	Start date	<p>Prior Consideration form was submitted to the UNFCCC on August 29/08/2013. All CPAs will state very clearly their start date, and evidence that their start date is not prior to the date of submission of Prior consideration form.</p>	<p>Starting date of the CPA is on or after the starting date of the PoA (date of the Prior Consideration form, 29/08/2013).</p> <p>Documents/evidence to be checked</p> <ul style="list-style-type: none"> • Date of launch of CPA as signified by substantial investment, or • Date of first plant installed under the CPA, or • Submission of prior consideration form
(e)	Methodology	<p>All the CPAs will comply with the CDM methodology used for this PoA i.e. AMS I.E, v.11.0</p> <p><u>Applicability criteria described in table 2, that are applicable to the CPA's, criteria 1.2.4.7.10</u> are included here, Criteria 8 on double counting is separately mentioned in this table.</p> <ol style="list-style-type: none"> 1. This category comprises activities to displace the use of non-renewable biomass by introducing renewable energy technologies. Examples of these technologies include, but are not limited to biogas stoves, solar cookers, passive solar homes, renewable energy-based drinking water treatment technologies (e.g. sand filters followed by solar water disinfection; water boiling using renewable biomass). 2. Project participants are able to show that non-renewable biomass has been used since 31 December 1989, using survey methods or referring to published literature, official reports or statistics. 3. The following further conditions apply for the fNRB value applied in a component project activity (CPA) of a PoA. The choice between (a) conduct own studies to determine the local fNRB value as per "TOOL30 v.2: Calculation of the fraction of non-renewable biomass" and then apply those values in the CPAs; and (b) use default national values approved by the Board shall be made ex ante. A switch from national 	<p>Each CPA will comply with the CDM methodology used in the PoA. Fulfilment of the applicability criteria will be described in the CPA-DD.</p> <p>Documents/evidence to be checked</p> <ol style="list-style-type: none"> 1. CPA-DD 2. The estimated number of biodigesters is to be defined in the CPA-DD. Not all may have been deployed at CPA inclusion stage, however the number of biodigesters included in each CPA can be checked through the electronic CPA database during verification, or 3. Contract of CPA implementer with CME 4. ER Calculation sheet to confirm the adjustment of leakage

		<p>value i.e. choice (b) to local values i.e. choice (a) is permitted, under the condition that the selected approach is consistently applied to all CPAs.</p> <p>4. Under this methodology, emission reductions cannot be claimed only due to fuel-switch aspect and proposed project activities shall introduce new renewable energy based technologies, i.e. technology switch is also involved.</p> <p>5. The leakages are estimated and accounted for, if required, on a sample basis using a 90/30 precision for the selection of samples, as per paragraph 39. of the methodology. transfer.</p>	
(f)	Additionality	The maximum power output of the technology shall be 100 kW or less, in order to remain on the positive list of Tool 32 v2.0	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • Power output of biodigester calculation sheet to confirm that each plant is not larger than 100 kW • Contract of CPA implementer with CME
(g1)	Stakeholder consultation	<p>All CPAs will perform the CPA level stakeholder consultation and adhere to these minimum requirements:</p> <ul style="list-style-type: none"> • be a physical meeting • invite parties that will be impacted by the projects or who are involved in the cook stove sector (end users, NGO, government agencies) or similar relevant sectors • provide an overview of the project • collect comments from participants • take account of the comments 	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • CPA level stakeholder consultation report
(g2)	Environmental Impact Analysis	Environmental Impact Analysis is carried out on PoA level.	Environmental Impact Analysis is carried out on PoA level.
(g3)	Monitoring	As per the methodology, <i>"monitoring shall consist of checking of all appliances or a representative sample thereof, at least once every two years (biennial) to ensure that they are still operating or are</i>	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • Electronic CPA database and hard copy files or equivalent in case the implementer uses

		<p><i>replaced by an equivalent in service appliance."</i></p> <p>The CPAs have procedures in place to track distribution of biodigesters. The tracking system will involve the recording of biodigester size, date of construction, contact information of owner and any other information that is deemed useful to locate the biodigester . Each biodigester will have a unique identification code .</p>	digital tools, of biodigesters at the time of verification
(g4)	Approval of CPA by CME	<p>All CPAs will have a project implementer that is either the Coordinating Managing Entity or another entity that has signed a contractual agreement with the Coordinating Entity to become a CPA implementer. Those agreements include all rights and responsibilities of both parties, e.g. approval procedures by the CME, monitoring requirements, CER rights transfer. This eligibility criterion is not necessary if the CPA implementer is the CME.</p> <p>All biodigesters listed in the CPA should be implemented under the National Biodigester Programmes lead by SNV and its partners.</p>	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • CPA implementer contract with CME • National Biodigester Programme is established
(g5)	Inclusion of CPA	Each CPA inclusion by CME shall be reviewed/approved by a DOE (except of the first CPA submitted with PoA for validation)	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • CME CPA inclusion report • DOE inclusion approval
(g6)	CER rights transfer	The households installing the biodigesters are the owner of the plants. They shall sign an agreement with the CME to transfer the carbon credit rights of these plants.	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • CER right transfer agreement clause in the biodigester documents
(g7)	fNRB	All CPAs in one country use the same value of fraction of nonrenewable biomass. The fraction and source will be fixed for each country upon inclusion of the first CPA.	<p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • CPA-DDs

(h1)	Funding from Annex I countries	Each CPA will state clearly in the CPA-DD the source of public funding, if any.	<u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> Statement of the CPA implementer
(h2)	No diversion of ODA	If funding from Annex -1 parties is received for any CPA, it should be confirmed that funding from Annex-1 parties does not result in a diversion of official development assistance.	<u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> Statement of the CPA implementer
(i)	Target Group and distribution mechanism	Target group of all the CPAs will be cattle and/or pigs holding household in the rural and semi urban areas of Benin and Burkina Faso, which are using non renewable biomass as cooking fuel; and are interested to use the biogas for cooking purpose. These households will be distributed across the three countries.	<p>Biodigesters will be installed by Biodigester Construction Companies (BCCs) contracted by the CPA implementer.</p> <p>Prior construction survey form will be filled in by BCCs before the installation of biodigesters in any household. Number of animals, use of non-renewable biomass for cooking before the installation of biodigester, and purpose of biodigester are recoded together with other information.</p> <p>Only households fulfilling the criteria will be included in the CPA database by the CPA implementer.</p> <u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> BCC contract with the CPA implementer CPA database
(j)	Sampling	<p>A statistically valid sample of the locations where the systems are deployed, with consideration, in the sampling design, of occupancy and demographics differences can be used to determine parameter values used to determine emission reductions, as per relevant requirements in the <i>“Standard for sampling and surveys for CDM project activities and programme of activities v8.0.”</i>⁴⁰</p> <p>The sampling plan contains information relating to: (a) sampling design; (b) data to be collected; and (c) implementation plan.</p>	<u>Documents/evidence to be checked</u> <ul style="list-style-type: none"> Description of sampling methodology in CPA-DD.

⁴⁰ https://cdm.unfccc.int/sunsetcms/storage/contents/stored-file-20191129115244256/Meth_stan05.pdf

		<p>The CPA complies with the following confidence interval and error requirement:</p> <ul style="list-style-type: none"> • When biennial inspection is chosen a 95% confidence interval and a 10% margin of error requirement for the sampling parameter. • When annual inspection is used, a 90% confidence interval and a 10% margin of error requirement is achieved for the sampled parameters. • In cases where survey results indicate that 90/10 precision or 95/10 precision (above) is not achieved, the lower bound of a 90% or 95% confidence interval of the parameter value is chosen as an alternative to repeating the survey efforts to achieve the 90/10 or 95/10 precision. <p>Sampling across CPA is possible if the CPAs are located in the same country and are disseminating the same type of biodigesters.</p>	
(k)	SSC Limit for CPA	Each CPA will include only so many biodigesters to fit within a small-scale threshold of no more than 45 MW _{th} of aggregated power output, and will remain within this threshold throughout the crediting period of the CPA ⁴¹	<p>Each CPA estimates the number of biodigesters to be installed in the CPA-DD. Please note that not all biodigesters may have been deployed at CPA inclusion stage, however the number of biodigesters included in each CPA can be checked through the electronic CPA database during verification.</p> <p><u>Documents/evidence to be checked</u></p> <ul style="list-style-type: none"> • Statement in CPA-DD • Biodigester output calculation sheet
(l)	De-bundling	As per Methodological Tool 20 – Assessment of debundling for small-scale project activities paragraph 17 ⁴² :	1% of the SSC threshold is 450 kW _{th} , which is larger than the additionality requirement criterion f of 100 kW biodigester size limit. CPA's that meet

⁴¹ For thermal applications of biomass/biogas, the limit of 45 MW_{th} is the installed/rated capacity of the thermal application equipment or device/s. Refer to the latest version of “General Guidelines to SSC CDM methodologies”. The manufacturers’ specifications on the installed/rated thermal output may be used. In the absence of manufacturers’ specification the installed/rated thermal output shall be determined based on a laboratory test undertaken by a nationally approved/accredited laboratory or alternatively by a laboratory complying with the requirements of a relevant national or international standard, e.g. ISO/IEC 17025. Relevant national/international standards for testing shall be used.

⁴² <https://cdm.unfccc.int/methodologies/PAmethodologies/tools/am-tool-20-v1.pdf>

		<p><i>If each of the independent subsystems/measures (e.g., biogas digester, solar home system) included in the CPA of a PoA is no larger than 1% of the small-scale thresholds defined by the methodology applied, then that CPA of PoA is exempted from performing de-bundling check i.e., considering as not being a de-bundled component of a large scale activity.</i></p>	<p>criterion f automatically meet the debundling requirements.</p>
--	--	---	--

Appendix 1. Contact information of coordinating/managing entity and project participants

Burkina Faso

Organisation	SNV Netherlands Development Organisation
Street/P.O. Box	Rue 17.02 Porte N°5
Building	-
City	Ouagadougou
State/Region	-
Postcode	BP625
Country	Burkina Faso
Telephone	+226 50 34 25 23, +226 50 34 71 59
Fax	+226 50 34 11 57
E-mail	burkina-faso@snv.org
Website	http://www.snv.org/
Contact person	
Title	
Salutation	Mr.
Last name	Lam
Middle name	-
First name	Jan
Department	
Mobile	+226 66201944
Direct fax	
Direct tel.	
Personal e-mail	jlam@snv.org

Benin

Organisation	SNV Netherlands Development Organisation
Street/P.O. Box	Rue 17.02 Porte N°5
Building	-
City	Ouagadougou
State/Region	-
Postcode	BP625
Country	Burkina Faso
Telephone	+226 50 34 25 23, +226 50 34 71 59
Fax	+226 50 34 11 57
E-mail	burkina-faso@snv.org
Website	http://www.snv.org/
Contact person	
Title	
Salutation	Mr.
Last name	Lam

Middle name	-
First name	Jan
Department	
Mobile	+226 66201944
Direct fax	
Direct tel.	
Personal e-mail	jlam@snv.org

Organization	Stichting SNV Nederlandse Ontwikkelingsorganisatie
Street/P.O. Box	Parkstraat83
Building	-
City	The Hague
State/Region	-
Postcode	2514JG
Country	Netherlands
Telephone	0031 70 3440 244
Fax	-
E-mail	info@snv.org
Website	www.snv.org
Contact person	Mr.
Last name	Lam
Middle name	-
First name	Jan
Mobile	+22666201944
Direct tel.	-
Personal e-mail	jlam@snv.org

Appendix 2. Affirmation regarding public funding

Submitted to DOE during CPI validation

Appendix 3. Applicability of methodologies and standardized baselines

N/A

Appendix 4. Further background information on ex ante calculation of emission reductions

Appendix 5. Further background information on monitoring plan

N/A

Appendix 6. Summary report of comments received from local stakeholders

N/A

Appendix 7. Summary of post-registration changes

N/A

Document information

<i>Version</i>	<i>Date</i>	<i>Description</i>
09.0	31 May 2019	Revision to: <ul style="list-style-type: none"> • Ensure consistency with version 02.0 of the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN); • Make editorial improvements.
08.1	28 June 2017	Revision to: <ul style="list-style-type: none"> • Remove a duplicated instruction; • Make editorial improvement.
08.0	7 June 2017	Revision to: <ul style="list-style-type: none"> • Improve consistency with the “CDM project standard for programmes of activities” and with the PDD and CPA-DD forms; • Make editorial improvement.
07.0	25 May 2017	Revision to: <ul style="list-style-type: none"> • Ensure consistency with the “CDM project standard for programmes of activities” (CDM-EB93-A07-STAN) (version 01.0); • Incorporate the “Programme design document form for small-scale CDM programmes of activities” (CDM-SSC-PoA-DD-FORM); • Make editorial improvement.
06.0	15 April 2016	Revision to ensure consistency with the “Standard: Applicability of sectoral scopes” (CDM-EB88-A04-STAN) (version 01.0).
05.0	9 March 2015	Revision to: <ul style="list-style-type: none"> • Include provisions related to choice of start date of PoA; • Include provisions related to delayed submission of a monitoring plan; • Provisions related to local stakeholder consultation; • Add exception for generic CPA where technology is under positive lists; • Make editorial improvement.
04.1	5 August 2014	Editorial revision to correct the document information table.
04.0	25 June 2014	Revision to: <ul style="list-style-type: none"> • Include the Attachment: Instructions for filling out the project design document form for CDM programme of activities (these instructions supersede the Guideline: Completing the programme design document form for CDM programme of activities (Version 04.0)); • Include provisions related to standardized baselines; • Add contact information on a responsible person(s)/ entity(ies) for the application of the methodology (ies) to the PoA in B.4 and Appendix 1; • Add general instructions on post-registration changes in paragraphs 2 and 3 of general instructions and Appendix 6; • Change the reference number from F-CDM-PoA-DD to CDM-PoA-DD-FORM; • Make editorial improvement.

<i>Version</i>	<i>Date</i>	<i>Description</i>
03.0	3 December 2012	EB 70 Revision to reflect changes to the <i>Guideline: Completing the programme design document form for CDM programmes of activities</i> (EB 70, Annex 6).
02.0	13 March 2012	EB 66 Revision required to ensure consistency with the "Guidelines for completing the programme design document form for CDM programmes of activities" (EB 66, annex 12).
01.0	27 July 2007	EB 33, Annex 41 Initial publication.
Decision Class: Regulatory		
Document Type: Form		
Business Function: Registration		
Keywords: programme of activities, project design document		